US009491532B2

(12) **United States Patent**
Halevi et al.

(10) **Patent No.: US 9,491,532 B2**
(45) **Date of Patent: *Nov. 8, 2016**

(54) **ADAPTER DEVICE TO ALLOW THE MONITORING OF MEDIA EXPOSURE ON CONSUMER DEVICES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 137 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **14/499,298**

(22) Filed: **Sep. 29, 2014**

(65) **Prior Publication Data**

US 2015/0098580 A1 Apr. 9, 2015

Related U.S. Application Data

(60) Provisional application No. 61/886,083, filed on Oct. 3, 2013.

(51) **Int. Cl.**

H04R 1/10	(2006.01)
H04R 1/06	(2006.01)
H04R 5/04	(2006.01)

(52) **U.S. Cl.**

CPC ***H04R 1/06*** (2013.01); *H04R 1/1033* (2013.01); *H04R 5/04* (2013.01)

(58) **Field of Classification Search**

CPC H04R 1/1033; H04R 5/04
USPC 381/56, 74, 384
See application file for complete search history.

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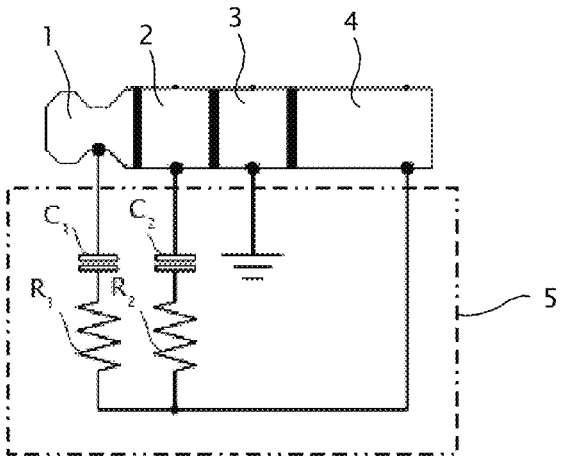
(57) **ABSTRACT**

Adapter devices are provided which are connectable to an audio connector of a media device. The audio connector of the media device is configured to receive an audio input from an external microphone and to output an audio output to an earphone. The adapter device includes a male plug adapted to be plugged into the audio connector of the media device, a female receptacle electrically connected to the male plug. The female receptacle is adapted to mate with an audio plug of a headset and an audio signal coupling configured to couple a portion of the audio output from the media device into the audio input to the media device.

12 Claims, 3 Drawing Sheets



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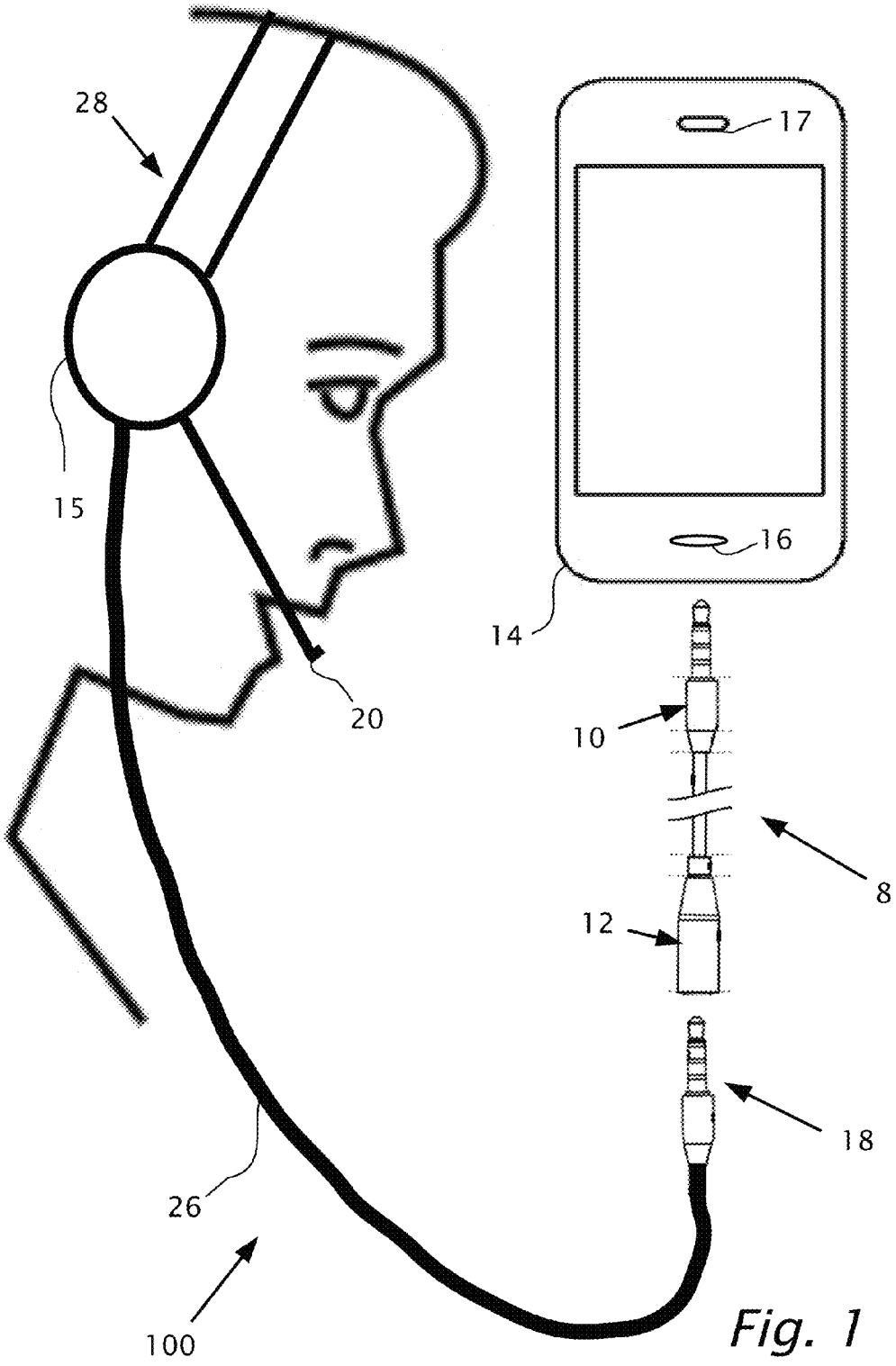

Fig. 1

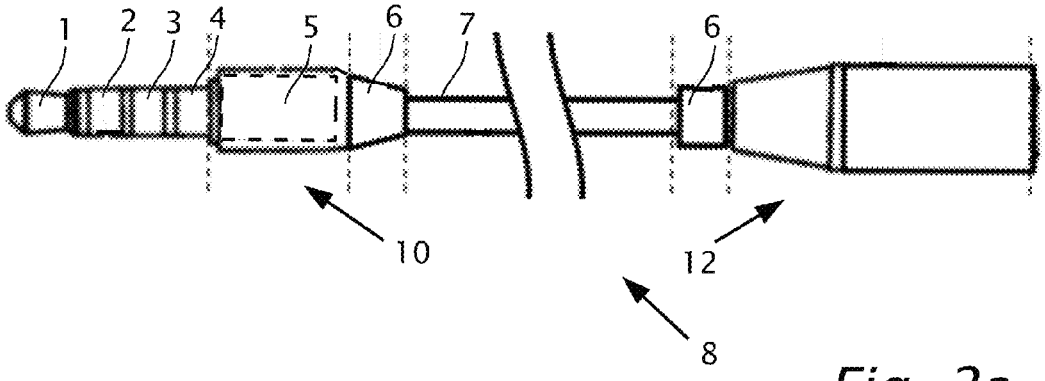

Fig. 2a

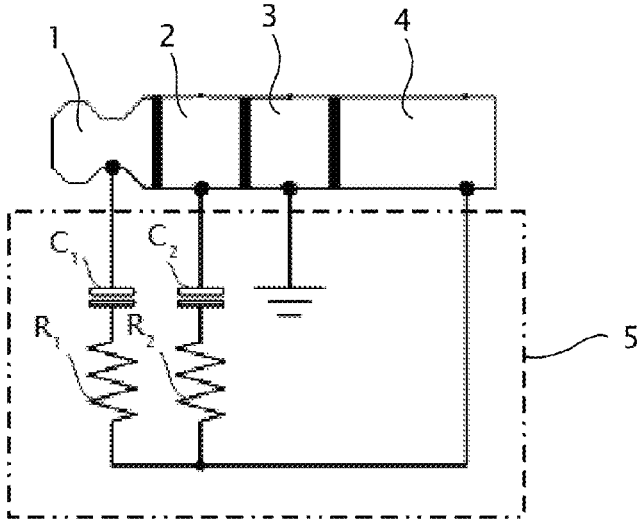

Fig. 2b

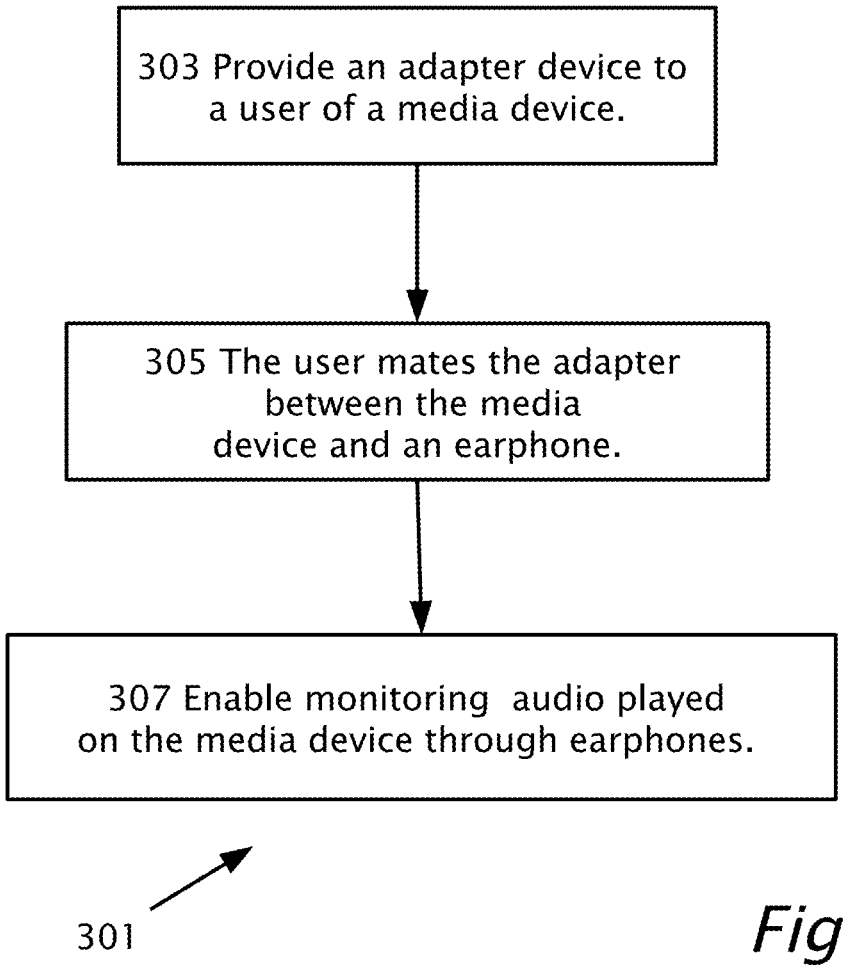
303 Provide an adapter device to a user of a media device.
305 The user mates the adapter between the media device and an earphone.
307 Enable monitoring audio played on the media device through earphones.
301

Fig. 3

ADAPTER DEVICE TO ALLOW THE MONITORING OF MEDIA EXPOSURE ON CONSUMER DEVICES

CROSS REFERENCE TO RELATED APPLICATIONS

The present application claims priority from provisional patent application 61/886,083 filed 3 Oct. 2013 in the United States Patent and Trademark Office by the present inventor, the disclosure of which is incorporated herein by reference.

BACKGROUND

1. Technical Field

The present invention relates to an audio adapter device.

2. Description of Related Art

Media research companies may provide measurements of media exposure on consumer devices. Media exposure may be measured in the vicinity of the media devices by recording ambient audio using a built-in microphone of the media devices.

Infotainment is a portmanteau of the terms information and entertainment to describe information-based media content or programming that also includes entertainment content in an effort to enhance popularity with audiences and consumers. Infotainment applications may include identification services and/or applications that use the built-in microphone of a personal media device, e.g. smart-phone, tablet computer to sample of music or other media being played in the vicinity of the personal device.

Both media research and infotainment may create an acoustic fingerprint based on the sample, and compares the acoustic fingerprint against a central database for a match, or look for pre-inserted watermark, i.e. encoding, which includes metadata as to the content in which the acoustic fingerprint or pre-inserted watermark are embedded into. If an identification is made, information such as the artist, song title, and album may be sent to the user or any other designated service can be provided.

BRIEF SUMMARY

Various adapter devices are provided herein which are connectable to an audio connector of a media device. The audio connector of the media device is configured to receive an audio input from an external microphone and to output an audio output to an earphone. The adapter device includes a male plug adapted to be plugged into the audio connector of the media device, a female receptacle electrically connected to the male plug. The female receptacle is adapted to mate with an audio plug of a headset. The adapter includes an audio signal coupling configured to couple a portion of the audio output from the media device into the audio input to the media device.

A multi-core cable may connect the male plug to the female receptacle. The audio signal coupling may be performed by a reactive or resistive circuit within the adapter device and the coupling may connect the audio output from the media device into the audio input to the media device. The reactive or resistive circuit may be included in at least one of the male plug, the female receptacle and the multi-core cable.

Various methods are provided herein for enabling monitoring audio played on a media device which includes a built-in microphone and an audio connector. The built-in microphone is disabled when an audio jack is plugged into the audio connector of the media device. An adapter device is provided which includes a male plug, a female receptacle electrically connected to the male plug and an audio signal coupling configured to couple a portion of the audio output from the media device into the audio input to the media device. When a male plug is mated with the audio connector of the media device a portion of the audio output from the media device is coupled into the audio input of the media device. Thus, the mating, or insertion of the adapter, enables monitoring audio content being played on the media device whilst a user of the media device listens to the audio content on an earphone plugged into the adapter. Another portion of the audio output of the media device is provided to the earphone.

Various systems are provided herein including a media device having a built-in microphone and an audio receptacle. The built-in microphone is disabled when a speaker is plugged into the audio receptacle of the media device. The system includes the adapter device having a male plug adapted to be plugged into the audio connector of the media device and a female receptacle electrically connected to the male plug. The female receptacle is adapted to mate with an audio plug. The audio plug may be an audio plug of a speaker, earphone, headset or a sound card. An audio signal coupling is configured to couple a portion of the audio output from the media device into the audio input to the media device. The audio signal coupling enables monitoring audio content being played by the media device. A multi-core cable may connect the male plug to the female receptacle. The audio signal coupling may be performed by a reactive or resistive circuit within the adapter device and connects the audio output from the media device into the audio input to the media device.

The foregoing and/or other aspects will become apparent from the following detailed description when considered in conjunction with the accompanying drawing figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

FIG. **1** shows a smart-phone, a person using a headset and an adapter device according to an embodiment of the present invention mated between the smart-phone audio connector and the headset.

FIG. **2***a* shows further details of the adapter device of FIG. **1**.

FIG. **2***b* shows an internal circuit of the adapter device of FIGS. **1** and **2**, according to a feature of the present invention.

FIG. **3** shows a method, according to a feature of the present invention.

The foregoing and/or other aspects will become apparent from the following detailed description when considered in conjunction with the accompanying drawing figures.

DETAILED DESCRIPTION

Reference will now be made in detail to features of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout. The features are described below to explain the present invention by referring to the figures.

Before explaining features of the invention in detail, it is to be understood that the invention is not limited in its

application to the details of design and the arrangement of the components set forth in the following description or illustrated in the drawings. The invention is capable of other features or of being practiced or carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein is for the purpose of description and should not be regarded as limiting.

By way of introduction, a consumer may be consuming media, e.g. listening to radio or watching a TV show. Media research companies and/or infotainment applications may use the built-in microphone of a media device, e.g. smart-phone, to sample ambient sound being played either by the media device or other ambient sound, e.g television, cinema. However, while using an attached earphone on the media device, the built-in microphone of the media device may be disabled and also not able to sample the played audio. The monitoring of media exposure then poses a challenge if the person is using a headset plugged into the audio connector of the media device. The audio signal from the earphone is too low in volume to be monitored using the microphone of the headset. Moreover, if the person is consuming ambient media, e.g. listening to radio and/or watching a movie, from for example the media device using a speaker plugged in to the audio connector of the media device then the built-in microphone of the media device is normally disabled, and the media device will not be able to record the ambient media. If the person is listening to FM radio using the built in speaker of a media device such as a smart-phone then, an earphone or other device is plugged into the audio connector of the media device to provide an aerial or antenna for the FM broadcast. Again, the built-in microphone is disabled and the content being listened to in this way will not be monitored.

A similar problem occurs when using song or other content identification service such as the SHAZAM™ application. If a person using SHAZAM™ is consuming media, e.g. listening to a song, and is using earphones plugged into the audio connector of a smart-phone, the content identification service will be unable to record any portion of the song and identify the song.

Thus there is a need for and it would be advantageous to have an adapter device which allows monitoring of audio played on the media device while a person is using earphones plugged into the audio connector of the media device.

Referring now to the drawings, reference is now made to FIG. **1** which shows a system **100** of a user using a media device **14** which includes an adapter device **8**, according to a feature of the present invention. Media device **14** may be for example an iPhone™, iPad™, hand held tablet device, Android™ operating system enabled device, laptop computer or smart-phone. Adapter device **8** includes a male plug **10** and female receptacle **12**. The user is shown wearing a headset **28** which includes a headphone **15** and a microphone **20**, by way of example. Connection to headset **28** is via cable **26** which is terminated by audio plug **18**. Audio plug **18** may be plugged into female receptacle **12**. Female receptacle **12** and male plug **10** are connected together electrically via a multi-core cable. Male plug **10** may be plugged into an audio connector (normally a female audio receptacle not shown) of media device **14**. Media device **14** includes an internal speaker **17** and internal microphone **16**. As shown in FIG. **1**, connectors are shown as 3.5 millimeter TRRS plugs. However, other types of connectors may be used such as micro USB™, Lightning™ (Apple™) or any other headset to device connector. Optionally, an external speaker or stereo speakers (not shown) may be plugged into female receptacle **12** instead of headset **28** using a different audio plug similar to audio plug **18**.

Reference is now made to FIG. **2***a* which shows adapter device **8** in more detail, according to a feature of the present invention. Female receptacle **12** and male plug **10** may be connected together electrically via a multi-core cable **7** and mechanically by respective sleeves **6**. Male plug **10** may include tip **1** and collars **2**, **3** and **4**. Tip **1** and collar **2** provide connection to left and right stereo audio output from the audio connector of media device **14**. Collar **3** is the ground connection and collar **4** is an external microphone input connection to media device **14**. Different devices may require different wiring between collars **1-4** and wire cores of multi-core cable **7**. Male plug **10**, according to a feature of the present invention includes a coupling circuit **5**. Circuit **5** may similarly be accommodated in female receptacle **12** in other embodiments of the invention.

Reference is now made to FIG. **2***b* which shows coupling circuit **5** in greater detail, according to a feature of the present invention. According to the circuit of circuit housing **5**, the left and right audio output, tip **1** and collar **2** respectively are coupled to collar **4** (provides the external microphone connection to media device **14**) via series capacitors and resistors R_1/C_1 and R_2/C_2 respectively. The component values series capacitors and resistors R_1/C_1 and R_2/C_2 are chosen so that an acceptable level of audio from the left and right audio output, tip **1** and collar **2** is coupled into collar **4**. Alternative reactive (using inductors and/or capacitors) and/or resistive circuits may be used as is well known in the field of electronics for implementing coupling circuit **5**.

Reference is now made to FIG. **3** which shows a method **301**, according to a feature of the present invention. In step **303**, a media research company or other third party, may provide device **8** to a user. In step **305**, the user plugs male jack **18** of the earphones/headset/speaker into female receptacle **12** of device **8** and male jack plug **10** of device **8** is plugged into the audio connector of media device, e.g smart-phone **14**.

Plugging in of adapter device **8** into media device **14** even without headset **28** plugged into device **8** provides an audio input by coupling to collar **4** which is a microphone input by capacitors and resistors R_1/C_1 and R_2/C_2 to tip **1** and collar **2** respectively which provide an stereo audio signal to earphones **15** or speakers when connected.

However, without device **8**, a user who normally watches and/or listens to media content on device **14** with headset **28** or speakers plugged into media device **14**, may cause internal microphone **16** of media device **8** to be muted, disconnected or otherwise disabled. Therefore, a media monitoring company is unable to monitor (step **307**) the audio listened to by the user of media device **14** even if external speakers are being used plugged into the audio connector of media device **14**. The plugging in of device **8** between media device **14** and headset **28** (step **305**), allows the media research company or other service such as SHAZAM™ to monitor (step **307**) the audio content of media being played on media device **14** whilst the user listens to the audio content on earphone **15** or speaker. Similarly, in the field of information entertainment, applications such as SHAZAM™ may successfully monitor the media being consumed and provide to the user information regarding the media being consumed even when the user is listening with earphones **15**.

A "media device", as used herein refers to a device which plays and records audio and/or video, including but not limited to a computer system, mobile computers, smart-

phones, tablet computers and/or other electronic devices such as media player/recorder.

The term "listening device" as used herein refers to a speaker, an earphone, a headset and/or a sound card.

The terms "earphone", "earphones" are used herein interchangeably. The term "headphone" and "headset" are used herein interchangeably and refer to earphones combined with a microphone.

The terms "audio jack", "audio plug", "male plug", "male connector" are used herein interchangeably to refer to a male type audio connector.

The term "audio connector" as used herein as part of the media device refers to a female type audio connector built in to the media device.

The indefinite articles "an adapter device", "an audio coupling" as used herein, such as "an", "a " has the meaning of "one or more" that is "one or more devices", or "one or more audio couplings".

Although selected features of the present invention have been shown and described, it is to be understood the present invention is not limited to the described features. Instead, it is to be appreciated that changes may be made to these features without departing from the principles and spirit of the invention, the scope of which is defined by the claims and the equivalents thereof.

The invention claimed is:

1. An adapter device connectable to an audio connector of a media device, wherein the audio connector of the media device is configured to receive an audio input from an external microphone and to output an audio output to a listening device, the adapter device including:

a male plug;

a female receptacle electrically connected to the male plug, wherein the male plug when plugged into the audio connector of the media device and when the female receptacle mates with an audio plug of the listening device,

an audio signal coupling is configured to receive the audio output from the media device and to route the audio output back to the media device.

2. The adapter device of claim **1**, further including:

a multi-core cable connecting the male plug to the female receptacle; wherein the audio signal coupling is performed by a reactive or resistive circuit within the adapter device.

3. The adapter device of claim **2**, wherein the reactive or resistive circuit is included in at least one of the male plug, the female receptacle and the multi-core cable.

4. A method for enabling monitoring audio played on a media device which includes a built-in microphone and an audio connector, and the built-in microphone is disabled when an audio jack is plugged into the audio connector of the media device, the method including:

providing an adapter device including a male plug, a female receptacle electrically connected to the male plug and an audio signal coupling configured to receive an audio output from the media device and to route the audio output back to the media device when the male plug is plugged into the audio connector of the media device and when the female receptacle mates with the audio jack.

5. The method of claim **4**, further comprising:

enabling monitoring audio content being played on the media device whilst a user of the media device listens to the audio content on a listening device.

6. The method of claim **4**, wherein the audio output of the media device is also transmitted to a listening device.

7. A system including an adapter device and a media device which includes a built-in microphone and an audio receptacle, and the built-in microphone is disabled when an audio jack is plugged into the audio receptacle of the media device, the adapter device comprising:

a male plug;

a female receptacle electrically connected to said male plug, wherein the male plug when plugged into the audio connector of the media device and when the female receptacle mates with an audio plug of a listening device

an audio signal coupling is configured to receive an audio output from the media device and route the audio output back to the media device, wherein the audio signal coupling enables monitoring audio content being played by the media device.

8. The system of claim **7**, wherein said audio plug is an audio plug of a speaker.

9. The system of claim **7**, wherein said audio plug is an audio plug of an earphone.

10. The system of claim **7**, wherein said audio plug is an audio plug of a sound card.

11. The system of claim **7**, further including:

a multi-core cable connecting the male plug to the female receptacle; wherein the audio signal coupling is performed by a reactive or resistive circuit within the adapter device.

12. The system of claim **11**, wherein the reactive or resistive circuit is included in at least one of the male plug, the female receptacle and the cable.

* * * * *